

CLAIMS

1. An RF mixer comprising:

a mixer core having an LO port for receiving an LO signal, an IF port for providing an

5 IF output signal, and an input port having an input terminal for receiving a current signal; and
an RF input section coupled to the input terminal for providing the current signal
responsive to an RF input signal;

wherein the RF input section includes:

10 a transistor coupled to the input terminal, and

an inductor coupled to the transistor to extend the dynamic range of the mixer.

2. An RF mixer according to claim 1 wherein:

the transistor includes a first terminal coupled to the input terminal, a second terminal
coupled to receive a reference signal, and a third terminal; and

15 the inductor includes a first terminal coupled to the third terminal of the transistor and
a second terminal coupled to receive the RF input signal.

3. An RF mixer according to claim 2 further including a current source coupled
20 to the second terminal of the inductor.

4. An RF mixer according to claim 1 wherein the transistor is a BJT transistor
25 configured for operation in common base mode.

5. An RF mixer comprising:

25 a mixer core having a first input terminal for receiving a first current signal and a
second input terminal for receiving a second current signal;

30 a first subcell coupled to the first input terminal of the mixer core to provide the first
current signal to the mixer core responsive to an RF input signal, the first subcell having a
first transistor and a first inductor coupled to the first transistor to extend the dynamic range
of the mixer; and

a second subcell coupled to the second input terminal of the mixer core to provide a

second current signal to the mixer core responsive to an RF input signal, the second subcell having a second transistor and a second inductor coupled to the first transistor to extend the dynamic range of the mixer.

5 6. An RF mixer according to claim 5 wherein:
the first transistor includes a first terminal coupled to the first input terminal, a second terminal coupled to receive the RF signal, and a third terminal; and
the first inductor includes a first terminal coupled to the third terminal of the first transistor and a second terminal coupled a common node.

10 7. An RF mixer according to claim 6 wherein:
the second transistor includes a first terminal coupled to the second input terminal, a second terminal coupled to receive the RF signal, and a third terminal; and
the second inductor includes a first terminal coupled to the third terminal of the second transistor and a second terminal coupled a common node.

15 8. An RF mixer according to claim 7 further including a current source coupled to the common node.

20 9. An RF mixer according to claim 5 wherein:
the first transistor includes a first terminal coupled to the first input terminal, a second terminal coupled to receive a reference signal, and a third terminal; and
the inductor includes a first terminal coupled to the third terminal of the transistor and a second terminal coupled to receive the RF input signal.

25 10. An RF mixer according to claim 9 wherein:
the second transistor is diode connected; and
the second inductor is arranged to degenerate the transconductance of the second transistor.

30 11. An RF mixer according to claim 9 wherein the second subcell further includes:

a third transistor coupled to the second transistor and the second input terminal and arranged to form a current mirror with the second transistor; and

a third inductor arranged to degenerate the transconductance of the third transistor.

5 12. An RF mixer according to claim 11 wherein the magnitude of the impedance of each inductor is greater than $r_e/2$ where r_e is the incremental resistance of the transistors.

13. A current mirror comprising:

10 a first transistor having a first terminal for receiving an input signal, a second terminal coupled to the first terminal of the first transistor to cause the first transistor to operate as a diode, and a third terminal;

15 a first inductor coupled between the third terminal of the first transistor and a common node to reduce the noise of the current mirror;

20 a second transistor having a first terminal for transmitting an output signal, a second terminal coupled to the first terminal of the first transistor, and a third terminal; and

25 a second inductor coupled between the third terminal of the second transistor and a common node to reduce the noise of the current mirror.

14. An RF amplifier comprising:

20 a first transistor coupled between a first node and a common node in a diode configuration;

25 a second transistor having a first terminal for transmitting an output signal, a second terminal, and a third terminal coupled to a second node;

30 a passive component coupled between the first and second nodes;

35 a delta-V_{be} cell referenced to the common node and having first and second load input terminals for loading the cell, and a sense terminal coupled to the first node for sensing the voltage across the first transistor;

40 a third transistor having a first terminal coupled to the common node, a second terminal coupled to the second load input terminal, and a third terminal coupled to the second terminal of the second transistor to provide a bias signal to the second transistor.